In the Claims

1. (Currently amended) A radiation source comprising a first active layer coupled to a second active layer, wherein the first and second active layers are separate, the first active layer produces primary radiation of frequency v_i by appropriate stimulation, and the primary radiation is converted by the second active layer to secondary radiation of frequency v_2 for subsequent output and wherein coupling occurs by an intermediary layer disposed between the first active layer and the second active layer, the intermediary layer comprising a noncrystalline material.

2. (Original) A radiation source according to claim 1, wherein additional active layers are provided, such that each active layer is coupled to a previous active layer, and each active layer subsequent to the first active layer modifies the radiation produced by the previous active layer.

3. (cancelled).

4. A radiation source according to claim [[3]] 1, wherein the intermediary layer is substantially optically transparent to the primary radiation, so providing optical coupling between the first active layer and the second active layer.

5. (Currently amended) A radiation source according to claim [[3]] 1, wherein the intermediary layer has a refractive index n which is less than 1, and less than or equal to the refractive index of the active layers positioned either side of the intermediary layer.

6. (Previously presented) A radiation source according to claim 1, wherein the first active layer comprises a semiconductor junction.

7. (Previously presented) A radiation source according to claim 1, wherein the radiation source further comprises an injection region incorporated in the first active layer, where injection of electrical carriers into the first active layer from the injection region stimulates the first active

layer to emit the primary radiation.

8. (Original) A radiation source according to claim 7, wherein the injection region is a p-n junction.

9. (Previously presented) A radiation source according to claim 1, wherein a first band gap energy is associated with the first active layer, and a second band gap energy is associated with the second active layer, the first band gap energy being much greater than the second band gap energy.

10. (Previously presented) A radiation source according to claim 1, wherein the active layers satisfy the following conditions:

$$hv_{\max} \leq E_{subsequent} + E_f * k < E_{previous}$$

$$1/\alpha_{entry} \leq d \leq 1/\alpha_{exit}$$

where hv_{max} is the maximum energy for the radiation [reduced] produced in a subsequent active layer optically connected with a previous active layer;

$E_{previous}$ is the band gap energy of the previous active layer;

$E_{subsequent}$, E_f are the band gap energy and the Fermi energy level of the active layer, respectively;

d is the thickness of the subsequent active layer;

α_{entry} and α_{exit} are the effective absorption coefficients for the radiation entering and exiting the subsequent active layer, respectively.

11. (Previously presented) A radiation source according to claim 1, wherein the active layers are made of A^3B^5 material and/or its solid solutions.

12. (Original) A radiation source according to claim 11, wherein at least one active layer comprises $InAs_{1-x-y}Sb_1P_y$, where $x+y<1$.

13. (Original) A radiation source according to claim 11, wherein at least one active layer comprises $In_{1-v}Ga_vAs_{1-w}Sb_w$, where $x+y< 1$, $w<1$ and $v<1$.

14. (Previously presented) A radiation source according to claim 1, wherein the first active layer and the second active layer are made from a material with a graded variation in band gap energy.

[[14]] 15. (Currently amended) A radiation source according to claim 2, wherein the additional active layers are made from a material with a graded variation in the band gap energy.

16. (Currently amended) A radiation source according to claim [[14]] 15, wherein the material with a graded variation possesses the radial symmetry of a unit cell.

17. (Previously presented) A radiation source according to claim 15, wherein the material with a graded variation adjoins the injection region along one edge where the material has a narrow band gap energy.

18. (Original) A radiation source according to claim 1, wherein the radiation source is a light emitting diode.

19. (Previously presented) A radiation source according to claim 3, in which the intermediary layer comprises two bonding layers each attached to a respective active layer, and a heat sink layer interposed between the two bonding layers, the heat sink layer being operable to conduct heat away from the active layers.

20. (Previously presented) A radiation source according to claim 19, in which the heat sink layer is composed of sapphire.

21. (Original) A radiation source according to claim 20, in which each bonding layer is composed

of chalcogenic glass and the sapphire layer is sandwiched between the glass layers.

22. (New) A radiation source according to claim 1, wherein the output of the radiation source is in the IR frequency range.

23. (New) A radiation source according to claim 1, in which an optical fibre is attached to the second active layer.

24. (New) A radiation source according to claim 1, wherein the active layers are made of a semi conductor material.

25 . (New) A radiation source according to claim 1, in which the intermediary layer is made of polymer compounds and parafins or liquids.

26 (New) A radiation source according to claim 1, in which the intermediary layer is made of chalcogenic glass.

27 (New) A radiation source according to claim 1, in which the source has a coating in contact with an active layer or active layer cap, said coating reducing internal reflection losses.

28. (New) A radiation source according to claim 27 in which the coating is of chalcogenic glass.

29. (New) A radiation source according to claim 27, in which the coating forms a Weierstrass sphere for forming a narrow far field pattern.

30. (New) An infrared radiation source comprising a first active semiconductor layer coupled to a second active semiconductor layer, wherein the first active layer produces primary radiation of frequency v_i by appropriate stimultaion, and the primary radiation is converted by the second active layer to secondary radiation of frequency v_2 for subsequent output, and an intermediary

layer disposed between the first semiconductor layer and the second semiconductor layer

31. (New) A radiation source according to claim 30, wherein additional active layers are provided, such that each active layer is coupled to a previous active layer, and each active layer subsequent to the first active layer modifies the radiation produced by the previous active layer.

32. (New) A radiation source according to claim 30, wherein the intermediary layer is substantially optically transparent to the primary radiation, so providing optical coupling between the first active layer and the second active layer.

33. (New) A radiation source according to claim 30, wherein the intermediary layer has a refractive index n which is greater than 1, and less than or equal to the refractive index of the active layers positioned either side of the intermediary layer.

34. (New) A radiation source according to preceding claim 30, wherein the radiation source further comprises an injection region incorporated in the first active layer, where injection of electrical carriers into the first active layer from the injection region stimulates the first active layer to emit the primary radiation.

35. (New) A radiation source according to claim 34, wherein the injection regions is a p-n junction.

36. (New) A radiation source according to claim 30, wherein a first band gap energy is associated with the first active layer, and a second band gap energy is associated with the second active layer, the first band gap energy being much greater than the second band gap energy.

37. (New) A radiation source according to claim 30, wherein the active layers satisfy the following conditions:

(1) $$hv_{\max} \leq E_{subsequent} + E_f * k < E_{previous}$$

(2) $$1/\alpha_{entry} \leq d < 1/\alpha_{exit}$$

where hv_{max} is the maximum energy for the radiation produced in a subsequent active layer optically connected with a previous active layer;

$E_{previous}$ is the band gap energy of the previous active layer;

$E_{subsequent}$, E_f are the band gap energy and the Fermi energy level of the active layer, respectively;

d is the thickness of the subsequent active layer;

α_{entry} and α_{exit} are the effective absorption coefficients for the radiation entering and exiting the subsequent active layer, respectively.

38 A radiation source according to claim 30, wherein the layers are made of A3B5 material and/or its solid solutions.

40. (New) A radiation source according to claim 30, wherein the first active layer and the second active layer are made from a material with a graded variation in band gap energy.

41. (New) A radiation source according to claim 31 wherein the additional active layers are made from a material with a graded variation in the band gap energy.

42. (New) A radiation source according to claim 41, wherein the material with a graded variation possesses the radial symmetry of a unit cell.

43. (New) A radiation source according to claim 42, wherein the material with a graded variation adjoins the injection region along one edge where the material has a narrow band gap energy.

44. (New) A radiation source according to claim 30, wherein the radiation source is a light emitting diode.

45. (New) A radiation source according to claim 30, in which the intermediary layer comprises

two bonding layers each attached to a respective active layer, and a heat sink layer interposed between the two bonding layers, the heat sink layer being operable to conduct heat away from the active layers.

46. (New) A radiation source according to claim 46, in which the heat sink layer is composed of sapphire.

47. (New) A radiation source according to claim 47, in which each bonding layer is composed of chalcogenic glass and the sapphire layer is sandwiched between the glass layers.

48. (New) A radiation source according to claim 30, in which the intermediary layer is made of polymer compounds and parafins or liquids.

49. (New) A radiation source according to claim 30, in which the intermediary layer is made of chalcogenic glass.

50. (New) A radiation source according to claim 30, in which the source has a coating in contact with an active layer or active layer cap, said coating reducing internal reflection losses.

51. (New) a radiation source according to claim 51 in which the coating forms a Weierstrass sphere for forming a narrow far field patttern.